Human Behavior, Development and Society
E-ISSN 2651-1762, Vol 23 No 2, August 2022

Nasopharyngeal Cancer in Malaysia: Perceived Severity, Susceptibility, and Barriers in Risk Messages[1]

Jia Yiing Ho, Su Hie Ting, and Yuwana Podin, Universiti Malaysia Sarawak

Date Received: 8 February 2022 Revised: 16 May 2022 Accepted: 31 May 2022

Abstract

Perceived severity and susceptibility of breast and lung cancers have been extensively studied but perceptions of the threat posed by nasopharyngeal cancer (NPC) is little understood. In this study perceptions were examined regarding the severity and susceptibility to NPC and barriers in taking preventive measures before and after reading specific cancer risk messages. The sample consisted of 65 participants living in the Kuching and Samarahan divisions of Sarawak, Malaysia who had not been diagnosed with NPC. Participants were interviewed about their perceived severity, susceptibility, and barriers towards the cancer before and after reading the NPC pamphlet, produced by the Ministry of Health, Malaysia. A total of 87.7% of participants perceived NPC as a severe disease, as it connotes death, scary symptoms, and disruption to the quality of life. Only 27.7% of participants believed that they were at risk of contracting NPC after reading the pamphlet. The common perceived risk factors were smoking, polluted environment, preserved food, and high NPC incidences in Malaysia. As for perceived barriers, 19% participants reported that living a healthy lifestyle would be hard, while 31% were fearful of screening. The study showed that the risk messages provided participants with more specific and accurate information on NPC.

Keywords: *Nasopharyngeal cancer, perceived severity, perceived susceptibility, barriers*

Introduction

Nasopharyngeal cancer (NPC), commonly known as nose and throat cancer, is a disease that develops in the head and neck region. The early signs are similar to common cold, which is why they are often ignored. Fles et al. (2016) stated that nose and throat cancer may present with (a) nosebleed which may flow into the throat, causing blood-tinged phlegm; (b) pain or blockage in the ear; (c) loss of hearing; (d) headache; (e) double vision; (f) facial pain; (j) numbness; and (h) a lump in the neck. Nasopharyngeal cancer is the fifth most common cancer in Malaysia after breast cancer, colorectal cancer, lung cancer, and lymphoma (Manan et al., 2019). The Malaysian cancer statistics suggest that some groups are more prone to NPC. Cases are higher among Chinese males as NPC ranks third after colorectal cancer and lung cancer with them whereas for Chinese females, NPC ranks ninth. Chinese males and other males (including those of Sabah and Sarawak with an indigenous heritage) are the most susceptible to getting NPC (Devi et al., 2004). Some of the deaths due to NPC can be avoided if the cancer is detected early and treatment is sought. The cancer is often treated using surgery, chemotherapy, and radiotherapy. It is responsive to treatment in the early stages; NPC is sensitive to chemo-radiotherapy and the two and three-year survival rate is 84% and 78%, respectively (Fles et al., 2017). However, in Malaysia, NPC cases are mostly diagnosed at stages 3 and 4 (63% for males, 60% for females; Manan et al., 2019). Regular cancer screening can make it possible to detect NPC early and avert some NPC deaths.

However, at the present time little is known about the awareness of Malaysians towards NPC and whether they recognize the early signs of the cancer. Thus far, studies conducted on NPC have been on its social impact (Armstrong et al., 2000) and on the epidemiology of the disease (Aziz et al., 2017; Prasad et al., 1989). Little is known about the impact of cancer risk messages on intention to undertake health protective measures, particularly how the information may sensitize people to the risks and severity of NPC. This study will provide a better understanding of the factors that cause the Malaysian

[1] This paper was first presented at the 3rd International Conference on Language Studies (iCLS 2021) held on 8–9 September 2021 at Universiti Malaysia Sarawak, Kota Samarahan, Malaysia.

public to seek treatment for NPC when the cancer is already developed. The information on Malaysian public's health motivations posters, with regards to seeking NPC treatment, will be useful in education programs to reduce barriers that prevent individuals from undertaking cancer screening or seeking treatment.

In this study perceptions of severity and susceptibility of NPC and barriers in taking preventive measures were examined before and after reading NPC risk messages.

Literature Review

The Health Belief Model (HBM) is a widely used social cognition model in health psychology (Becker et al., 1977; Rosenstock et al., 1988). The model has been used to understand the failure of people to adopt disease prevention strategies and screening for the early detection of disease. The following explanation of HBM is based on Strecher and Rosenstock (1997).

The HBM posits that people's health behaviors are influenced by four belief constructs: Perceived susceptibility (risk of getting diseases), perceived severity (seriousness of health conditions), perceived benefits (usefulness of taking recommended health behaviors), and perceived barriers (obstacles to taking recommended health behaviors). These four belief constructs influence intention to perform health behaviors. Two additional constructs added to HBM were self-efficacy (confidence in own ability to take action) and response efficacy (confidence in the effectiveness of the health measures).

The HBM is appropriate for a study on perceptions of susceptibility, severity, and barriers based on studies conducted on other diseases. In oral health, Hollister and Anema (2004) found that the primary caregiver must believe that the child is susceptible to dental caries, it is a serious threat, and that the condition can be prevented if they undertake behavioral changes. The health model has also been employed in studies on breast and cervical cancer (Austin et al., 2002; Thomas et al., 2005). In studies on HIV using HBM, perceived susceptibility does not influence intention to minimize HIV risk, but prior perceptions of AIDS and past behavior exerts a stronger influence on behavioral intentions (Adams et al., 2014). Past behavior, response efficacy, beliefs, and barriers influenced intentions to adopt safer sex practices (Hingson et al., 2007). With HIV, the single perceived barrier is condom use (Hounton et al., 2005). The belief barriers relevant to NPC are not known.

What is currently known, from the research literature, about the risk factors for NPC are that Epstein-Barr virus infection, smoking, frequent consumption of salted fish, and preserved food are the most significant (Zheng et al., 1994). Non-environmental risk factors of NPC include family history, gender, and ethnicity (Fles et al., 2017). On the severity of the cancer, NPC can cause conditions ranging from nosebleed and ear pain to numbness (Fles et al., 2016). Ting et al. (2021) found that there was a general fear of cancer and of the side-effects of chemotherapy and imminent death, but the Malaysian participants in their study could not highlight specific symptoms or the consequences of the cancer. This shows a lack of awareness regarding the risks and severity of NPC.

Information on severity, susceptibility, benefits, and barriers in health risk messages may influence motivation to adopt health protective measures. Arpan et al. (2017) reported that integrated, affirming texts in public service announcements increased self-efficacy and intention to reduce risky behaviors. McCall and Ginis (2004) found that patients in a cardiac rehabilitation program who read gain-framed messages exercised more than those who did not read any such messages. Investigation of responses to belief constructs in cancer risk messages will push the HBM framework further.

Method of Study

The descriptive study involved interviews with 65 participants, aged 13–65, living in Kuching (capital of the East Malaysian state of Sarawak) and Kota Samarahan districts. Table 1 shows the demographic characteristics of the participants. A majority were students and working adults from Chinese and Malay ethnic backgrounds, who had university qualifications. There were more participants aged 13–40 as compared to participants aged 51–70. This was on account of the locality of the data collection, which was mainly in schools and at conferences. All the participants had not diagnosed with NPC.

The instruments used were a NPC pamphlet produced by the Ministry of Health Malaysia (Figure 1) and a semi-structured interview guide. Appendix 1 shows the interview questions on perceived severity and susceptibility towards NPC and perceived barriers to preventive measures, which were formulated based on HBM.

Table 1 *Demographic Characteristics of the Participants* (*N* = 65)

Demographic Characteristic		*n*	**%**
Gender	Male	37	56.9
	Female	28	43.1
Age (Years)	13–20	14	21.5
	21–30	20	30.8
	31–40	14	21.5
	41–50	12	18.5
	51–60	3	4.6
	61–70	2	3.1
Ethnic Background	Malay	20	30.8
	Chinese	29	44.6
	Indian	1	1.5
	Bidayuh	4	6.2
	Iban	5	7.7
	Others	6	9.3
Education	Primary 6	4	6.2
	Form 3	6	9.2
	Form 5	4	6.2
	Certificate	3	4.6
	Form 6	5	7.7
	Bachelor	23	35.4
	Masters and Ph.D	20	30.8
Monthly Income	Not working	19	29.2
	< RM2000	7	10.8
	RM 2000–RM 3999	13	20.0
	RM 4000–RM 5999	5	7.7
	RM 6000–RM 7999	5	7.7
	RM 7999–RM 9999	9	13.8
	> RM 10000	7	10.8

Figure 1 *Original Nasopharyngeal Cancer Pamphlet Produced by the Ministry of Health, Malaysia*

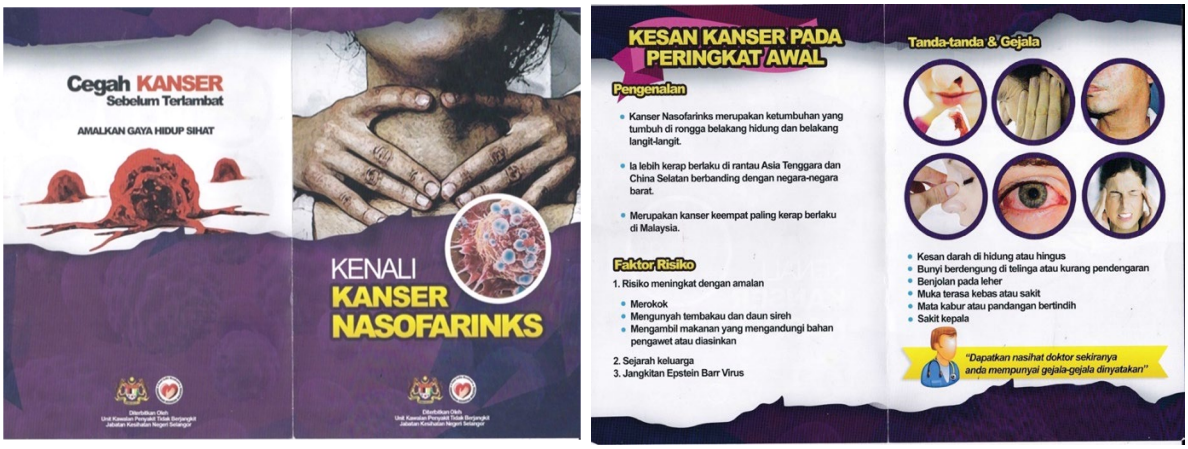
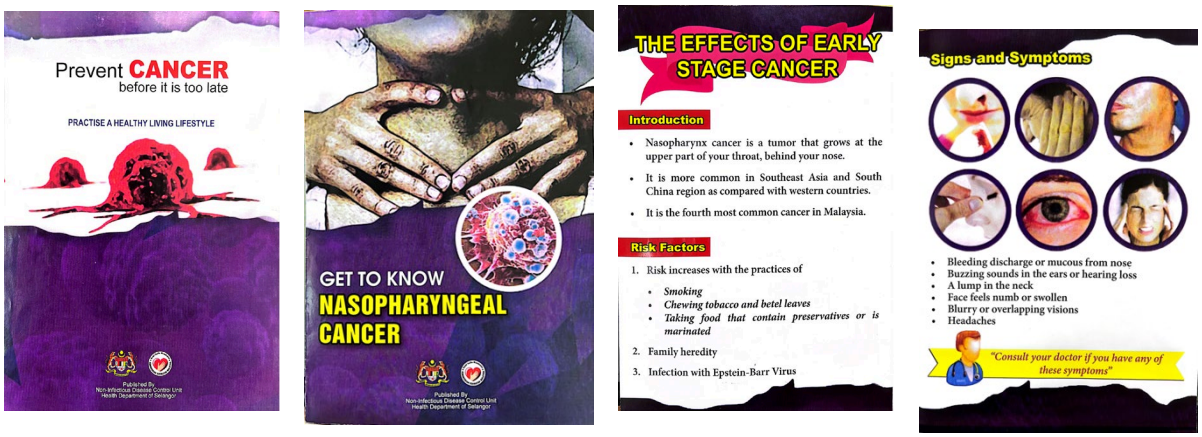


Figure 2 *NPC Pamphlet Translated into English Language*



For the data collection, participants were asked Questions 1–10 (Appendix 1) and given a few minutes to read the NPC pamphlet. Then, they were asked Questions 11–25. The mean time taken by the participants to read the health pamphlet was 48 seconds. The interviews lasted from 13 minutes to 56 minutes. The marked differences in the time taken for the interviews was due to the participants' speed in reading and understanding the pamphlet and the extensiveness of responses to the interview questions, which was influenced somewhat by their interest and knowledge of NPC.

For the data analysis, the audio-recorded interviews were transcribed verbatim. Thematic analysis of the interview transcripts was carried out following Rubin and Rubin (2012) to identify themes and sub-themes related to susceptibility, severity, and barriers. Concept maps were drawn to show the results for the three constructs of health belief. Perceived benefits were not examined in this study.

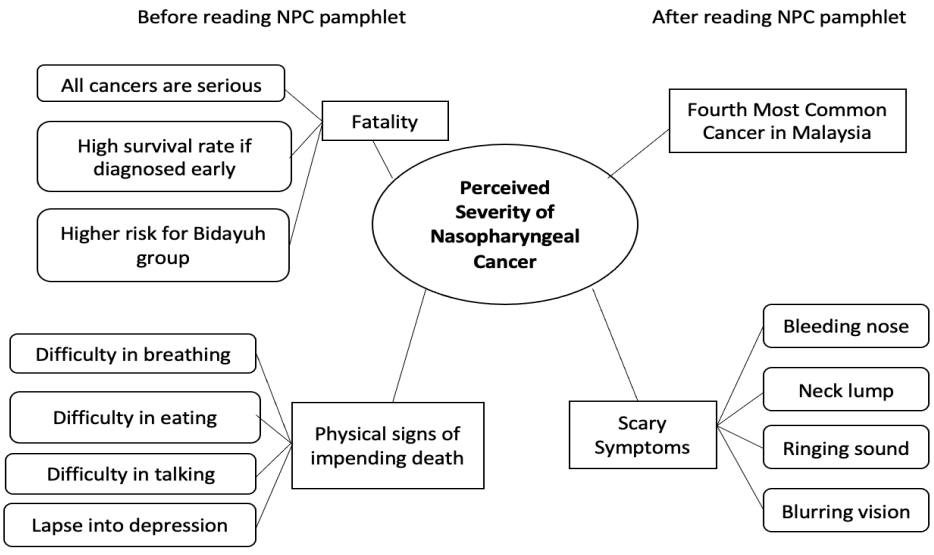
Results

In this section, results on perceived severity, perceived susceptibility, and perceived barriers are presented. The participants are referred to using codes, P1 for Participant 1 to P65 for Participant 65.

Perceived Severity of Nasopharyngeal Cancer

The interview results showed that the four most frequently perceived severities of nasopharyngeal cancer were fatality, disruption to the quality of life, scary symptoms, and NPC being the fourth most common cancer in Malaysia (Figure 3).

Figure 3 *Perceived Severity of Nasopharyngeal Cancer*



The analysis showed that 87.7% (or 57) out of 65 participants perceived NPC as a serious disease. Two participants did not know much about NPC, while two were unsure about the severity of NPC. Another four had more knowledge of NPC, indicated by comments that NPC was "pretty common" and severity was linked to the stage of the cancer ("depends on the stage").

To 17 participants, the word "cancer" itself was synonymous with the severity of the disease. Participant 4 said, "Since the word cancer is there, I think it is serious." The severity of NPC is due to its deadliness and incurability. Participant 52, a Chinese postgraduate, stated that the word "cancer" leads to fatality. A further comment (Excerpt 1) was: "Yes, because the pamphlet mentioned it's the fourth most deadly cancer that is found in Malaysia. I feel the public should be aware of this."

Many participants paid attention to the statistics on NPC being the fourth common cancer in Malaysia provided in the NPC pamphlet. The incurability of cancer was highlighted by Participant 11, a sales executive in her twenties: "Any form of cancer is a serious disease … because … er … the rate of … er … what do you call that … the rate for you to be cured is very little for cancer."

The second reason given by participants to explain why they considered NPC a severe disease was the physical signs of impending death. The participants brought up four early signs of NPC, which were difficulty in breathing, eating, talking, and depression. The physical discomfort caused by damage to the nose and throat area was highlighted by P5, a Malay assistant administrator, in Excerpt 3, as follows. "Because we are breathing using our nose and then we eat using our throat. So if that one erm … have *rosak* [not functioning], you cannot eat properly, you cannot eat the food you like."

Participants 23, 37, 42, 47, and 53 were also aware that damage to the nasopharynx would cause difficulty in breathing, eating, and talking. The physical debilitation may lead to depression.

Thirdly, the perception of severity of NPC was derived from the "scary symptoms of NPC" shown in the NPC pamphlet. A Bidayuh technician, P16, reasoned that NPC was serious because "If you constantly have blood coming out from your body, it is serious. It is not normal." There were six other participants who found the "blood symptom" scary (e.g., bleeding, blood stains, blood comes out, so much blood).

Two participants were the exception. Participant 25, a Vietnamese lecturer, felt that the NPC symptoms listed in the pamphlet were not scary and represented normal flu symptoms, as indicated in Excerpt 4.

> Not really. You put like this [hands and nose], it's just like you have flu. This is just, red eyes? This one [hands covering ears], noisy? In your childhood, all of us experience at least once [ear ringing]. To me, it is not serious.

To make the NPC pamphlet more effective in scaring people, a Malay executive officer, P2, suggested that photographs of real people and the word "danger" should be used (Excerpt 5).

> I think the brochure is very safe. It's not … the pictures are not real. If you have real pictures, real faces. I think you can put here. Be more simpler. But … this is simple, macam mana cakap [how to say]. Need to be more interactive la. Kalau boleh [If possible]). This is good actually … But … perhaps the picture is not impactful. And I think you have to put the website ke … ya something like that. And then, dia punya ini pun, the tajuk [the title], instead of kenali [Get to know], kita boleh cakap bahaya [we can say danger].

Of the four aspects of NPC severity, three (fatality, physical signs of impending death, scary symptoms) were found in the NPC pamphlet, but information on the consequences of the cancer to life came from the participants' own experiences and knowledge.

Perceived Susceptibility

Table 2 shows that the NPC pamphlet informed the participants on the risks of developing the cancer, as shown by the reduced percentages of those who reported that they were not at risk or did not know anything about the risk. For those who had some idea of their risk, the percentage increased from 35.4% to 44.6%. The percentage also increased for the group who were certain that they were at risk (from 20% to 27.7%).

Table 2 *Perceived Susceptibility of NPC Before and After Reading the NPC Pamphlet*

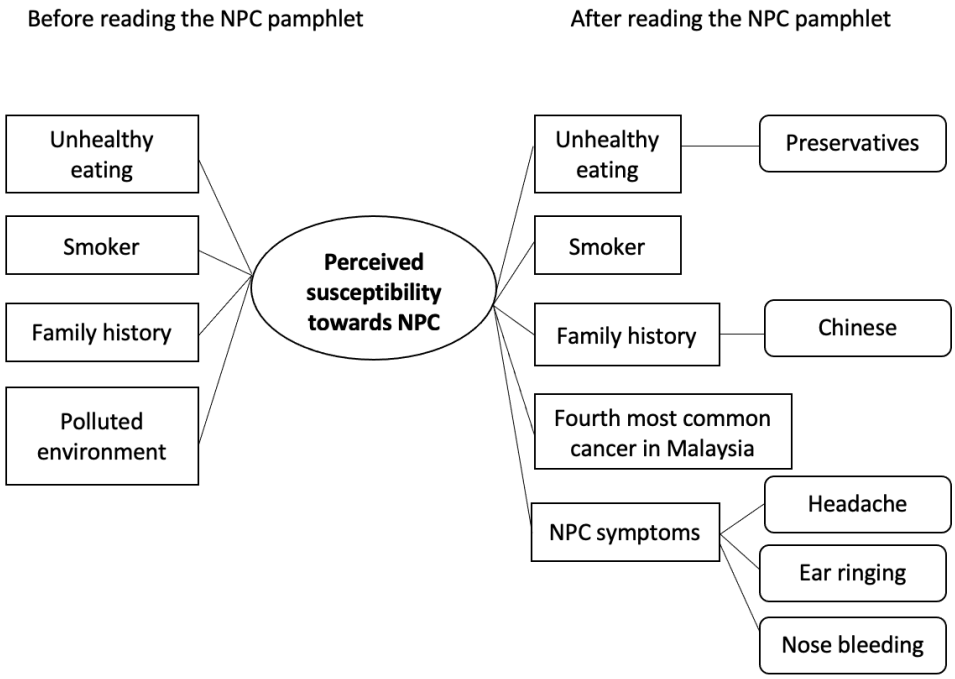
Perceived Susceptibility	Before Reading the Pamphlet	After Reading the Pamphlet
Not at risk	21 (32.3%)	18 (27.7%)
Maybe at risk	23 (35.4%)	29 (44.6%)
Yes, at risk	13 (20.0%)	18 (27.7%)
Do not know	8 (12.3%)	0 (0%)

Figure 4 shows participants' perceived susceptibility to NPC before and after reading the NPC pamphlet. It also shows the participants' perceptions on risk factors predisposing to NPC. Before reading the NPC pamphlet, the participants said that smoking, unhealthy eating, family history, polluted environment, age, and ethnic background were risk factors. Smoking was listed as the first factor in the NPC pamphlet, but before reading it, most of the participants already identified smoking as a common cause for cancer. Participant 3, a retiree, who initially said "No [I'm not susceptible to NPC], I don't smoke" changed his mind after reading he pamphlet. He said, "Probably, probably. If you avoid [the risk factors], then it [NPC] won't happen. If you don't avoid, and continue, then it'll happen."

After reading the NPC pamphlet, additional symptoms mentioned by participants as indicative of NPC were headache, ear ringing, and nose bleeding. They felt that if they already experienced the early symptoms of NPC, they might have NPC. Before reading the NPC pamphlet, they mentioned unhealthy eating as a cause of NPC, but the pamphlet alerted them to the danger of preserved food. Generally, unhealthy food is thought of as salty and oily food in Malaysia, but fewer people put preserved food in this category.

Interestingly, although Epstein Barr virus infection was listed as a risk factor in the NPC pamphlet, none of the participants mentioned it after reading the pamphlet. They continued to mention the three risk factors that were not stated in the pamphlet, that is, polluted environment, age, and ethnic background. These items represented general knowledge that they had acquired from various sources. Excerpts will be shown to show their level of knowledge on these risk factors.

Figure 4 *Participants' Perceived Susceptibility of NPC Before and After Reading the NPC Pamphlet*



On the polluted environment, P59, a researcher on NPC, recounted her childhood memories when she was helping her dad in a wood factory. After reading the pamphlet, she said she was not

susceptible to NPC because she consumed healthy food, went for regular screening, and exercised regularly. Her responses are given in Excerpt 6 as follows: (Before reading the NPC pamphlet): "If I eat a healthy diet, I'm fine. And do regular check-up. Exercise more. Eat healthy food. Try to … if you're working in a carcinogenic environment, you try to follow the working procedures." (After reading the NPC pamphlet): "Even though sometimes we lead a healthy lifestyle, there are still people who smoke, and there's family genetic issues."

This educated participant used the adjective "carcinogenic" to describe the environment based on her prior knowledge of NPC. Her post-reading responses showed that she had gained new information from the NPC pamphlet that eliminated her risk to NPC on account of her early exposure to wood dust.

On the susceptibility of certain ethnic groups to NPC, apparently some participants were informed. For instance, P30, a lecturer, believed that he could be at greater risk of NPC because he was a Chinese (Excerpt 7).

> First thing, I'm a Chinese. Second thing, it's the fourth highest cancer in Malaysia. Even if I don't smoke, the risk is still high. You look at the genetic, it is also one of the important factors. In other words, Malaysians are susceptible to NPC.

Another participant (a postgraduate student) with some knowledge on NPC knew that the Bidayuh group of Sarawak was also susceptible to NPC (Excerpt 8).

> As a master's student, I focus on … I did quite an amount of literature review, so I think that in Sarawak, it's a very crucial issue that I think is awaited to be supported, because among the Bidayuh group especially, the risk of getting nasopharyngeal cancer is relatively higher. (Source: P2)

Devi et al. (2004) reported the high incidence of NPC among Chinese and Bidayuh in Malaysia. Since the risk factors given by the participants before and after reading the pamphlet were similar, this shows that the pamphlet may have been effective in only identifying preserved food as unhealthy food and alerting them to early signs of NPC.

Perceived Barriers

Figure 5 shows the two perceived barriers to taking measures to avoid NPC, which participants talked about after reading the recommended actions in the NPC pamphlet. A small proportion (19%) of the participants found it challenging to lead a healthy lifestyle because they lacked discipline and were busy with work or study. Another 14% reasoned that consulting a doctor was difficult and gave reasons such as "financial constraints," "no time," and "fear of pain and facing the truth."

When asked if they would like to lead a healthy a lifestyle, 100% of the participants agreed they did. However, when asked if it would be easy for them to lead a healthy lifestyle, eight participants reasoned that self-discipline was the barrier preventing them to do so. A Malay executive in her twenties, P2, expressed her desire to lead a healthy lifestyle, but gave in due to her bad habit of unhealthy food intake and peer influence (Excerpt 10).

> Because you see, it's hard to break the habit. It's the habit. Besides, the culture don't allow us to change the habit. I'm not sure about Sabah and Sarawak. When I went Sabah and Sarawak, I don't see 24 hours mamak stall. But in Kuala Lumpur [the capital of Malaysia], we've 24 hours mamak stalls, KFC, Starbucks. It's very accessible. So if you don't get it, it's just like not a normal person, not normal person, you're just … not keep up with the trend. Peer influence, I think.

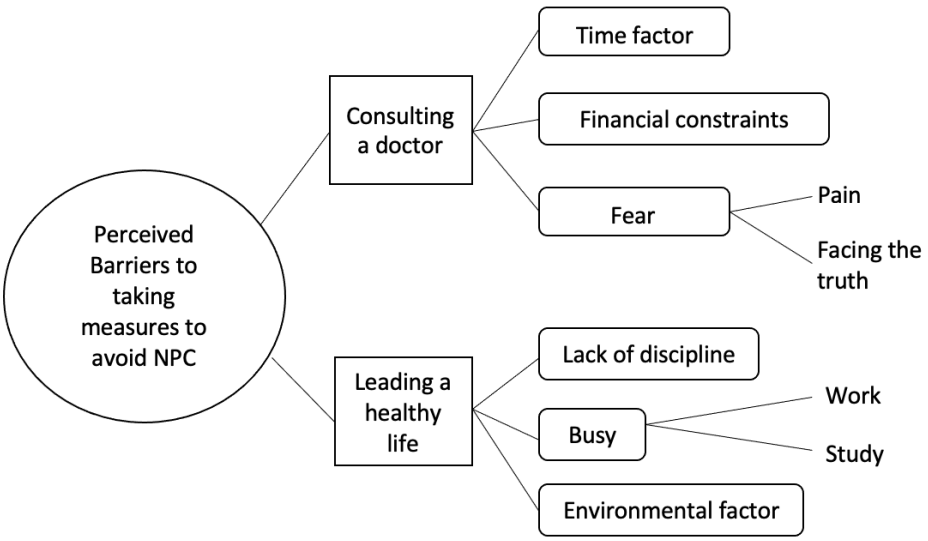
Besides unhealthy food like instant noodles and junk food (P6), participants also found it hard to exercise regularly. Participant 8, an Indian assistant administrator, said that it was hard for him to set aside time for exercising (Excerpt 11).

> (Laughs) It's not easy. Sometimes, we don't think, especially when we work. Normally, we will put aside this unhealthy lifestyle, because of stress. When we go home, it's so hard for us to exercise for 30 minutes. But maybe for eating, that one we can do. Not for exercise, because that needs time.

Secondly, consulting a doctor to avoid NPC was a main barrier to 14% of the participants. The reasons given were time and financial constraints, and fear of pain and fear of facing the truth. The perceived barriers for P47, a Malay lecturer in his forties, were as follows (Excerpt 12).

> No, I don't hate going to the doctor for consultation. But I really feel bad with the consultation that take too long time, when it shows only a symptom. For those who have money, they can go to private clinics. But you don't have money, so you have to go to the public clinics, the government clinics and all those. And then it so happens that you've to wait. I mean you've to wait at 7am because you know the clinic is full with patients of course it's free, isn't it?

Figure 5 *Perceived Barriers to Taking Measures to Avoid NPC After Reading the NPC Pamphlet*



-

The final barrier preventing them from seeking medical consultation was fear of pain and fear of facing the truth. Participant 60, an undergraduate student, said that she "feel scared" to consult the doctor. Similarly, P14, an indigenous administrator revealed her fear of facing the truth of cancer (Excerpt 13).

> Usually it's either I'm neglecting the fact that I may be sick, or I am afraid of these things that are happening to me or I'm trying my best not to accept the reality that it could, it's not the symptoms of nose and throat cancer. Yeap, like the fear of it.

To sum up, the barriers preventing participants from consulting a doctor were time, finance, and fear, while the barriers preventing them from leading a healthy lifestyle were time and lack of discipline. In this study, information on the participants' perceived barriers to taking actions to minimize NPC risk was obtained after they had viewed the pamphlet. Due to the sequence of interview questions, their perceived barriers before viewing the pamphlet was not elicited. The interview began with questions on perceived risk and severity and the focus then turned to barriers in the last part of the interview. They were not directly asked about barriers but they provided the information as a justification of whether it was easy or difficult for them to consult the doctor if they had NPC symptoms and to lead a healthy lifestyle to avoid getting NPC. The data on barriers were also obtained through an open question on whether it was easy or difficult for them to take the recommended actions in the pamphlet. The information in the pamphlet was mostly on NPC risk and severity, which was why we investigated the changes in these perceptions before and after reading the pamphlet. The pamphlet did not address barriers. Furthermore, it is unlikely that barriers would have changed after viewing the pamphlet, as this comes from an individual's personal experiences and their situation.

Discussion

The study on perceived susceptibility, severity, and barriers before and after reading an NPC pamphlet yielded three notable findings. First, the study showed that the noun "cancer" conjured fear among the general public. It brought images of sick and suffering patients, losing weight, undergoing chemotherapy, and lying on one's deathbed. Second, we showed that perceptions of susceptibility towards NPC could be changed after exposure to health risk messages in pamphlets. For example, P30 switched from using the first personal pronoun "I" to "Malaysians" when he was assessing his risk of getting NPC. He did not utter "I am susceptible to NPC." By unconsciously using a third person reference, he distanced himself from the perceived risk of NPC. Nonetheless, while individuals' perceptions may change, the topic of cancer remains taboo in Malaysia. This is seen in research that found hesitation among people in assessing their risk of NPC (Ting et al., 2018). They reported that some individuals believed that if they estimated their risks to be high, it is as if they were cursing themselves with cancer; yet, they were afraid to assess their risk as low because it showed that they did not believe in God's control over their lives.

Finally, the study revealed that Malaysians encounter barriers when it comes to leading a healthy lifestyle and consulting a doctor to avoid ailments. The result confirms previous findings that patient-reported barriers to cancer screening were fear, lack of information, time, access to care, and absence of physician advice (McLachlan et al., 2012). Another study revealed that barriers to screening were financial constraints, low self-worth, and negative past experiences with screening (Jones et al., 2010). Though screening can be effective in early cancer detection at treatable stages, a large proportion of people at risk have not been screened or are not screened regularly, as recommended by National guidelines (James et al., 2002).

Conclusion

The study on NPC perceptions showed increased knowledge of the cancer, moderate perceived severity, moderately high perceived susceptibility, and weak perceived barriers towards NPC after exposure to NPC risk messages in a pamphlet produced by the Malaysian Ministry of Health. The most striking finding from our study was the changes of expressions participants used to describe their health beliefs towards NPC before and after reading the NPC pamphlet. The expressions used after participants had viewed the pamphlet suggested that participants have gained new knowledge about NPC. It is hoped that future NPC health communication can address the fears of seeking medical attention and highlight the significance of overcoming time and financial barriers. When the public is aware of the severity, susceptibility, and barriers of NPC, they would be willing to go for regular screening, which would lead to earlier detection of NPC and better treatment and survival outcome. To our knowledge, our study is the first in Malaysia to report perceptions of severity and susceptibility towards NPC and perceived barriers to taking preventive measures to reduce NPC risk. However, the findings are limited to the people who are residing in Kuching and Kota Samarahan districts of Sarawak. Research in other communities residing in other places should be conducted.

Acknowledgement

This work was funded by the Ministry of Education, Malaysia via the Transdisciplinary Research Grant Scheme (TGRS) [Grant no. C09/TGRS/1519/2016].

References

Adams, L. M., Stuewig, J. B., Tangney, J. P., & Kasdan, T. B. (2014). Perceived susceptibility to AIDS predicts subsequent HIV risk: A longitudinal evaluation of jail inmates. *Journal of Behavioral Medical, 37*(3), 511–523.

Armstrong, R., Armstrong, M., & Lye, M. (2000). Social impact of nasopharyngeal carcinoma on Chinese households in Selangor, Malaysia. *Singapore Medical Journal*, *41*(12), 582–587.

Arpan, L. M., Lee, Y. S., & Wang, Z. (2017). Integrating self-affirmation with health risk messages: effects on message evaluation and response. *Health communication*, *32*(2), 189–199.

Austin, L. T., Ahmad, F., McNally, M. J., & Stewart, D. E. (2002). Breast and cervical cancer screening in Hispanic women: a literature review using the health belief model. *Women's Health Issues*, *12*(3), 122–128.

Aziz, A., Ramli, R. R., Mohamad, I., & Bhavaraju, V. M. K. (2017). Young nasopharyngeal carcinoma: a review of an 8-year experience in the East Coast Malaysia Hospital. *The Egyptian Journal of Otolaryngology*, *33*(2), 490–494.

Becker, M. H., Maiman, L. A., Kirscht, J. P., Haefner, D. P., & Drachman, R. H. (1977). The health belief model and prediction of dietary compliance: A field experiment. *Journal of Health and Social Behavior*, *18*(4), 348–366.

Devi, B. C., Pisani, P., Tang, T. S., & Parkin, D. M. (2004). High incidence of nasopharyngeal carcinoma in native people of Sarawak, Borneo Island. *Cancer Epidemiology and Prevention Biomarkers*, *13*(3), 482–486.

Fles, R., Bos, A., Rachmawati, D., Waliyanti, E., Tan, I., Haryana, S., Schmidt, M., & Dewi, F. (2017). The role of Indonesian patients' health behaviors in delaying the diagnosis of nasopharyngeal carcinoma. *BMC Public Health*, *17*(1), 1–8.

Hingson, R. W., Strunin, L., Berlin, B. M., & Heeren, T. (1990). Beliefs about AIDS, use of alcohol and drugs, and unprotected sex among Massachusetts adolescents. *American Journal of Public Health*, *80*(3), 295–299.

Hollister, M. C., & Anema, M. G. (2004). Health behavior models and oral health: a review. *American Dental Hygienists' Association*, *78*(3), 1–6.

Hounton, S. H., Carabin, H., & Henderson, N. J. (2005). Towards an understanding of barriers to condom use in rural Benin using the Health Belief Model: A cross sectional survey. *BMC Public Health*, *5*(1), 1–8.

James, A. S., Campbell, M. K., & Hudson, M. A. (2002). Perceived barriers and benefits to colon cancer screening among African Americans in North Carolina: How does perception relate to screening behavior? *Cancer Epidemiology and Prevention Biomarkers*, *11*(6), 529–534.

Jones, R. M., Devers, K. J., Kuzel, A. J., & Woolf, S. H. (2010). Patient-reported barriers to colorectal cancer screening: a mixed-methods analysis. *American Journal of Preventive Medicine*, *38*(5), 508–516.

Manan, A. A., Basri, H., Kaur, N., Rahman, S. Z. A., Amir, P. N., Ali, N., Raman, S., Bahtiar, B., Ramdzuan, N. S. M., Soffian, S. S. S., Othman, R., & Aziz, A. A. (2019). *Malaysia National Cancer Registry Report 2012–2016* [Report]. Ministry of Health Malaysia.

McCall, L. A., & Ginis, K. A. M. (2004). The effects of message framing on exercise adherence and health beliefs among patients in a cardiac rehabilitation program. *Journal of Applied Biobehavioral Research*, *9*(2), 122–135.

McLachlan, S.-A., Clements, A., & Austoker, J. (2012). Patients' experiences and reported barriers to colonoscopy in the screening context: A systematic review of the literature. *Patient Education and Counseling*, *86*(2), 137–146.

Prasad, U., Pathmanathan, R., Sam, C., Rampal, L., & Singh, J. (1989). Early diagnosis of nasopharyngeal carcinoma: a multi-pronged approach. In D. V. Ablashi, A. Faggioni, G. R. F. Krueger, J. S. Pagano, & G. R. Pearson (Eds), *Epstein-Barr Virus and Human Disease* (pp. 385–389). Springer.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. *Health Education Quarterly*, *15*(2), 175–183.

Thomas, V. N., Saleem, T. & Abraham, R. (2005). Barriers to effective uptake of cancer screening among Black and minority ethnic groups. *International Journal of Palliative Nursing*, *11*(11), 562–571.

Ting, S. H., Ho, J. Y., & Podin, Y. (2021, January 9). *Expressions of perceived severity towards nasopharyngeal cancer.* Proceedings of the First International Conference on Government Education Management and Tourism (ICoGEMT), Bandung, Indonesia. https://ir.unimas.my/id/eprint/35397/1/Expressions%20of%20Perceived%20Severity%20towards%20Nasopharyngeal%20Cancer.pdf

Ting, S., Jerome, C., Podin, Y., & Wan Ahmad, S. (2018, November 4–5). *Evaluating nose and throat cancer risk: Number sense and taboos on ill-health.* Proceedings of 2nd International Conference on Social and Economic Development (ICSED2). Kuala Terengganu. http://ir.unimas.my/id/eprint/22965

Zheng, Y., Tuppin, P., Hubert, A., Jeannel, D., Pan, Y., Zeng, Y., & De Thé, G. (1994). Environmental and dietary risk factors for nasopharyngeal carcinoma: a case-control study in Zangwu County, Guangxi, China. *British Journal of Cancer*, *69*(3), 508–514.

Appendix 1: Semi-structured Interview Guide on NPC

1. Have you heard of nose and throat cancer?
2. If yes, where and how did you learn about this cancer?
3. How do you know if a person has nose and throat cancer?
4. What do you think are the signs of nose and throat cancer?
5. Do you think nose and throat cancer is a serious disease?
6. What makes you say so?
7. What do you think are the causes of nose and throat cancer?
8. Do you think you might be at risk of nose and throat cancer?
9. What makes you say so?
10. What would you do to prevent nose and throat cancer? [Show the NPC pamphlet]
11. Is there anything new you learnt about nose and throat cancer?
12. If so, what are the new things learnt?
13. This pamphlet makes me feel that I am risk of nose and throat cancer. (1–*strongly disagree*; 7–strongly agree)
14. Why do you circle that?
15. This pamphlet makes me feel that nose and throat cancer is serious. (1–*strongly disagree*; 7–*strongly agree*)
16. What makes you think so?
17. What does this pamphlet recommend you to do to avoid nose and throat cancer?
18. Would you consult the doctor to avoid nose and throat cancer if the symptoms show? (1–*definitely no*; 7–*definitely yes*)
19. What makes you think so?
20. Is it easy for you to consult the doctor if the symptoms show? (1–*very hard*; 7–*very easy*)
21. What makes you think so?
22. Would you lead a healthy lifestyle to avoid nose and throat cancer? (1–*definitely no*; 7–*definitely yes*)
23. What makes you think so?
24. Is it easy for you to lead a healthy lifestyle? (1–*very hard*; 7–*very easy*)
25. What makes you think so?